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(i) $x = t, \quad y = t^2 \quad z = t^3$

$r = xi + yj + zk$

$r = ti + t^2j + t^3k$

$\frac{dr}{dt} = 1i + 2tj + 3t^2k$

$|dr/dt| = \sqrt{(dx/dt)^2 + (dy/dt)^2 + (dz/dt)^2}$

$= \sqrt{(1)^2 + (2)^2 + (3)^2}$

$= \sqrt{14}$

Unit tangent at $t = 1$, $T(1) = \frac{1 + 2(1)j + B(1)^2}{\sqrt{14}} = \frac{1 + 2t}{\sqrt{14}}$

$= 6/\sqrt{14} = \frac{1 + 2j + 3k}{\sqrt{14}}$.

(2) $G = A \times B$

$A = 4t^3 j + 5k$

$B = 2t^2 i + 4t j$

$$\begin{vmatrix} i & j & k \\ 0 & 4t^3 & 5 \\ 2t^2 & 4t & 0 \end{vmatrix}$$

$$i = \begin{vmatrix} 4t^3 & 5 \\ 4t & 0 \end{vmatrix} \quad -j = \begin{vmatrix} 0 & 5 \\ 2t^2 & 0 \end{vmatrix} \quad +k \begin{vmatrix} 0 & 4t^3 \\ 2t^2 & 4t \end{vmatrix}$$

$i = [20t] \quad -j = [10t^2] + k[8t^5]$

$20t\,i - 10t^2 j + 8t^5 k$

$$\int_0^1 20t - 10t^2 + 8t^5$$

$$\left[\frac{20t}{2} - \frac{10t^3}{3} + \frac{8t^6}{6} \right]_0^1$$

$$\left[10t - \frac{10t^3}{3} + \frac{4t^6}{3} \right]_0^1$$

$$\frac{10(1)}{1} - \frac{10(1)^3}{3} + \frac{4(1)^6}{3} - 0$$

$$10 - \frac{10}{3} + \frac{4}{3}$$

$$\frac{30 - 10 + 4}{3} = \frac{30 - 14}{3}$$

$$= \frac{24}{3} = 8 \text{ square units}$$